

LucidDreamer: Towards High-Fidelity Text-to-3D Generation via Interval Score Matching

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Abstract

The recent advancements in text-to-3D generation mark a significant milestone in generative models, unlocking new possibilities for creating imaginative 3D assets across various real-world scenarios. While recent advancements in text-to-3D generation have shown promise, they often fall short in rendering detailed and high-quality 3D models. This problem is especially prevalent as many methods base themselves on Score Distillation Sampling (SDS). This paper identifies a notable deficiency in SDS, that it brings inconsistent and low-quality updating direction for the 3D model, causing the over-smoothing effect. To address this, we propose a novel approach called Interval Score Matching (ISM). ISM employs deterministic diffusing trajectories and utilizes interval-based score matching to counteract over-smoothing. Furthermore, we incorporate 3D Gaussian Splatting into our text-to-3D generation pipeline. Extensive experiments show that our model largely outperforms the state-of-the-art in quality and training efficiency. Our code is available at: EnVision-Research/LucidDreamer